4:Grajdanzev--57 S-4 (no date) 1942 Formosans
116, 249, 474, 177.24 Japan
636.24

"The culture of sugar cane and the development of the sugar industry is considered one of the most spectacular achievements of the Japanese administration in Taiwan. Here we shall discuss only the culture of sugar cane; the sugar industry as such will be examined later in the section on industry. Sugar cane is an indigenous culture and was not introduced into Taiwan by the Japanese. The Dutch found it there in the 17th century and encouraged it. Before the advent of the Japanese it was produced by Chinese producers' cooperatives, which well deserve a special investigation because of their original character. They not only raised sugar cane, but also extracted the sugar in their old-fashioned mills. The industry had so developed that in 1893, ninety-eight million pounds of sugar were exported and probably not less than that amount was consumed in Taiwan, so that total production may be estimated at about 200 million pounds. This amount was not reached again until twenty years later. (1) With the coming of the Japanese the guerilla war continued for several years and ruined the industry. "

1. Japanese sources say that at the time of Japan's occupation of Taiwan the annual output was only about 80,000,000 kin (104 million pounds). This can hardly be true if in 1893 exports alone equalled 98,000,000 pounds. In 1880 exports equalled 141.5 million pounds.

4:Grajdanzev--57-59 S-4 (no date) 1942 Formosans-1-2
116. 242. 439. 654, 177.24 Japan
636.24

"At the time of annexation the Japanese [58] government was anxious to improve their 'unfavorable' balance of trade with foreign countries, and the cultivation of sugar cane in Taiwan appeared to be an excellent means of doing this. Japan's imports of sugar at that time were in excess of twenty million yen—about ten per cent of her total imports, and at times equal to the 'unfavorable' balance of trade. Sugar cane is grown in Japan, but climatic conditions and limited area make it impossible to increase the total production significantly. At the most it can supply only a small percentage of the domestic demand for sugar. But Taiwan with its tropical climate could be successfully used for this purpose.

As early as 1896 seeds of improved types of sugar cane were imported from the Hawaiian Islands. In 1898, Kodama, the Governor-General of Taiwan, and his energetic Governor Goto began conferences with Japanese financiers on the question of investment in the sugar industry of Taiwan. A special investigation of the outlook for sugar cane culture in Taiwan was entrusted to Dr. Inazo Nitobe, who presented his report in 1901. In this report Dr. Nitobe recommended that the irrigated area and the area under cultivation be increased through various measures of encouragement, assistance, and direct government action, the establishment of sugar research stations, and the introduction of improved varieties of sugar cane, while other recommendations were made concerning sugar manufacture. The government followed these recommendations, established experimental

stations, imported new varieties of sugar cane from Hawaii and Java, and paid special subsidies and grants to the manufacturers and farmers to induce them to follow its policy. Up to March 31, 1932, it had paid about thirteen million yen in subsidies. Moreover, in 1903 a relatively moderate protective tariff on sugar imported into the Japanese Empire was introduced, the rate being 0.8 sen per kin (0.6 kg.) on No. 20 standard and higher. This rate was increased to 4.65 sen per kin in 1911 on No. 21 standard and higher, to 5.3 sen in 1927 on No. 22 standard and higher, and to 7.15 sen in 1932. As a result—this is the official version—wealth came to the sugar [59] industry and to the island 'and this has resulted in the present industrial prosperity'."

4:Grajdanzev--59-60 S-4 (no date) 1942 Formosans-1-3
116, 249, 311

"The area under sugar cane, the cane crop, and yield per ko were increasing in Taiwan as follows:

	Area (ko)	Cane crop (in million kin or 600 metric tons)	Yield per ko (in 1,000 kin or 600 kg)
1905-06	35,158	1,690.2	48.1
1908-09	39,035	2,219.5	56.9
1914-15	85,150	3,933.8	46.2
1917-18	150,450	6,817.5	45.3
1919-20	108,376	4,382.5	40.4
1920-21	142,032	6,752.8	47.5
1921-22	123,233	7,793.7	63.2
1926-27	101,531	7,412.0	73.0
1927-28	108,318	9,697.6	89.5
1928-29	120,046	12,291.9	102.4
1929-30	109,397	11,618.4	106.2
1930-31	99,094	10,944.7	110.4
1931-32	109,496	13,415.2	122.5
1932-33	83,690	8,782.0	104.8
1933-34	91,163	8,883.8	97.4

116, 249, 311

	Area (ko)	Cane crop (in million kin or 600 metric tons)	Yield per ko (in 1,000 kin or 600 kg)
1934-35	121,628	13,477.3	110.8
1935-36	128,329	13,190.4	102.8
1936-37	124,555	14,271.9	114.6
1937-38	134,208	15,101.1	112.5
1938-39	149,834*	19,602.1*	130.8

* There are reasons for questioning the data for 1938-39. If they are accurate, the acute shortage of sugar in Japan in 1939-40 is hard to explain. Japanese official figures for the rice crop in 1939 were also extraordinarily optimistic in spite of drought, but it is hard to understand why it was necessary to import rice hurriedly from foreign countries, wasting scarce foreign exchange if there was such an abundance of rice at home. The story is the same with sugar. Why was it necessary to introduce sugar ration cards cutting the average per capita consumption in half, if there was a tremendous increase in production? The estimates for 1940 reveal a sharp fall.

In 33 years the area under sugar cane increased almost four times, total production twelve times, and the yield per ko 2.7 times.

4:Grajdanzev--59-60 S-4 (no date) 1942 Formosans-3
116, 249, 311

In 1939 the Japanese Empire occupied seventh place (1) among [60] producers of sugar

1. Others in order of importance were Cuba, India, U.S.S.R., Germany, U.S.A., Java.

and fourth place among producers of cane sugar. The Japanese sugar industry became a factor of world importance. It is true that Japan exports very little sugar, but her absence from the world market as a purchaser is of considerable importance."

4:Grajdanzev--60-61 S-4 (no date) 1942 Formosans-1-2
116, 249, 433, 458, 654, 177.24 Japan
636.24

"There can be no doubt as to the importance of sugar cane cultivation and of the sugar industry in Taiwan and the degree of success achieved by the Japanese government and Chinese cultivators.

However, a close examination of the table [See page 59, category 116--analyst] reveals some interesting features. It was pointed out how much effort was expended by the officials on the improvement of sugar cane culture. But in spite of all the efforts of the government and of the experimental stations the yield per ko did not show any signs of improvement during the first fifteen years. If the development was as steady as is officially described, why then was the increase of production up to 1921 taking place exclusively as a result of the increase in the planted area?

Further, the increase in sugar production may also come through the increase of sugar content in the juice of the sugar cane. It is interesting to note that in this respect too, little, if any, improvement is noticed up to 1922, but that after that year the sugar content rose from 9.5 per cent in 1922 to 13.2 per cent in 1935 and in this year was considerably higher than in Java or Cuba (12.3 and 11.6 per cent respectively). Finally, the table shows that after the peak of production (and area) was reached in 1917-18, production fell, then rose slowly up to 1928-29, fell sharply by almost thirty per cent and then began to rise again.

The explanation of these fluctuations is that the Taiwan sugar industry (and, as a consequence, also the cultivation of sugar cane) passed through several crises of the most severe character. 'Overproduction' is a word familiar to this industry, and to the planters also. Of course, it must be emphasized that this 'overproduction' is of a special character, because the consumption of sugar in Japan is relatively low and, though physically the demand of the population for sugar [61] is not satisfied, there is insufficient purchasing power available to buy it.

All this is very important for the problem in hand. The government's efforts were probably as great from 1900 to 1922 as afterward, subsidies were given more lavishly than later on, but the results in the first twenty years were rather meagre. In other words, the development was due not so much to the government's and the manufacturers' efforts as to some other factors inherent in the development of the economy of Taiwan and Japan."

4:Grajdanzev--61 S-4 (no date) 1942 Formosans
116, 249, 423, 471, 177.47 Japan
636.47

"The old type of sugar cooperatives dominating the industry before 1895 disappeared with the advent of capitalistic forms of enterprise in Taiwan. Production of sugar is now carried on in modern mills which are the property of the Japanese sugar companies possessing tremendous amounts of capital (several hundred million yen). Step by step these companies acquired a huge area of cultivated land——from 63.2 thousand ko in 1925 this area increased to 93.2 thousand ko in 1935. The latter figure amounts to more than ten per cent of the cultivated area of the island, but in the regions where sugar cane is cultivated the companies own more than twenty per cent of the area under cultivation (1).

1. Actually their influence is greater than these figures suggest because they rent about 20,000 ko of land.

However, it would be a mistake to think that this huge area is used by the manufacturers for sugar cane plantations. They plant only about 18,000 to 25,000 thousand ko with cane, while all other sugar cane is bought by them from the small farmers, i.e. about three-quarters of the total sugar cane production is supplied by 127,000 to 130,000 farmers, each planting on the average only half a ko."

4:Grajdanzev--63-64 S-4 (no date) 1942 Formosans-1-2
116, 241, 249, 435

"Although we have no reliable data concerning the profitability of sugar cane in Taiwan as compared with other crops, we can make certain calculations which will help us to see what the farmer gained from its cultivation. The average holdings of farmers did not increase after 1913 and therefore a larger income in these circumstances could be secured in only two ways—through an increase in yield or a rise in the price of sugar cane or both. The improved yields came as a result of the use of better seedlings, earlier ploughing, more careful attention, greater use of fertilizers, better irrigation. Some of these items demand more labor on the part of the farmer; almost all demand a greater expenditure in money. Let us now compare the receipts of the farmer per ko.

Receipts of Sugar Cane Cultivators in Taiwan

	1921	1927	1935	1936	1937
Yield per ko (1,000 kin)	63.2	89.5	102.8	114.6	112.5
Price per 1,000 kin (yen)*	9.6	7.6	3.4	4.1	4.5
Value per ko (yen)	696.7	537.0	349.5	469.9	506.3
Value per ko at 1913 prices, yen (approximately)	330.0	310.0	220.0	290.0	270.0

* For 1921-27 for the price 'the cost of raw material for manufacturers of sugar in Taiwan' is taken (Takahashi, op. cit., p. 216); for the later years. the price as it is given in the value of total production of sugar cane in Nogyo nenkan; the actual price is probably smaller.

Great accuracy cannot be claimed for these figures but they may give an idea of the trend. The yield since 1921 was doubled, but the receipts in deflated money do not show any improvement. This may be partially due to the fact that the general index of prices should not be used to deflate values in this case; a special index of prices paid by the farmer might show somewhat better results. But the expenditures which the farmer now incurs in order to secure these increased yields—fertilizers, irrigation, etc.—were not deducted, and if they are taken into consideration, one is forced to the conclu-[64] sion that some one other than the farmer got the benefits of the better yields."

"The number of other animals in Taiwan may be seen from the following table (in thousands):

	1921	1932	1933	1935	1937	1938
Sheep	...	0.3	0.3	0.4	0.3	...
Goats	...	90.1	87.0	78.3	70.4	...
Pigs	1,281	1,754	1,807	1,873	1,849	1,827
Poultry	4,452	5,267	5,747	6,466	7,703	7,947
Geese	190	306.3	319.6	370.8	401.5	394.2
Ducks	890	1,379	1,496	1,772	1,958	2,225
Turkeys	...	9.2	11.2	18.5	30.8	35.3

As regards pigs and poultry the situation is more favorable: there was a considerable increase in pigs, poultry, geese, and ducks. On the average there are four pigs (including sucklings) and eighteen to nineteen hens per farming family (assuming that only farmers keep pigs and fowl). These are an important source of meat and income. (1) The development is a consequence of the growth of the sugar industry—the cane waste can be utilized

1. The official estimate of an average per capita pork consumption of more than 28 kin a year (37 pounds) is probably an exaggeration. In 1938 one million pigs were killed. If consumption per capita averaged 28 kin, each pig must have weighed 160 kin, but the official estimate of the average weight is 130 kin.

on the farm as fodder. In this respect Taiwan is much better off than Korea. But one should not exaggerate the importance of these figures. It was officially estimated that in 1937 the gross value of products of animal breeding in Taiwan was ¥49.2 million or slightly more than twelve per cent of total agricultural production."

C

6: Kirchhoff--28 U-4 (no date) 1895 Formosans
249

Indigenous are also the important fiber plant Boehmeria nivea, the so-called China nettle, a near relative of our stinging nettle, and the beautiful Araliacee Fatsia papyrifera, whose stem turns into wood and grows to the height of a man within one year, and which bears a chain of long-stalked leaves on its crest divided like hands, and whose unusually plentiful pith provides the valuable material for the manufacture of Chinese pith paper (incorrectly called rice paper).

6: Kirchhoff--33 U-4 (no date) 1895 Formosans
116, 249

The manufacture of sugar and the preparation of tea are altogether in Chinese hands. The first in particular represents considerable values, although the wares are of poor quality only, about half the raw juice remaining unused in the waste owing to the insufficient pressure (it is done between two stone cylinders turned by buffalo or oxen).

6: Kirchhoff--33 [3] U-4 (no date) 1895 Formosans
116, 249

The indigo, which is grown for the most part in North Formosa, yields a dye by dissolving, and is exported in this state, but it is also used in Formosa as the source of a very fast dye for materials.

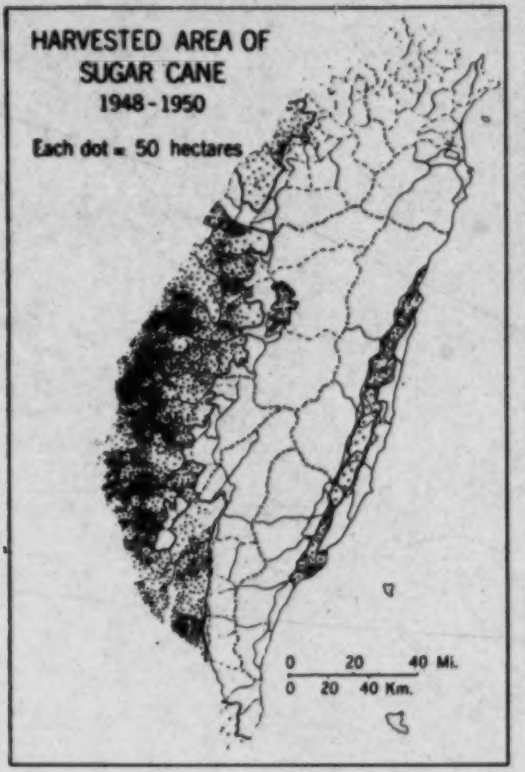
HARVESTED AREA OF
SUGAR CANE
1948-1950
Each dot = 50 hectares
0 20 40 Mi.
0 20 40 Km.

FIG. 22

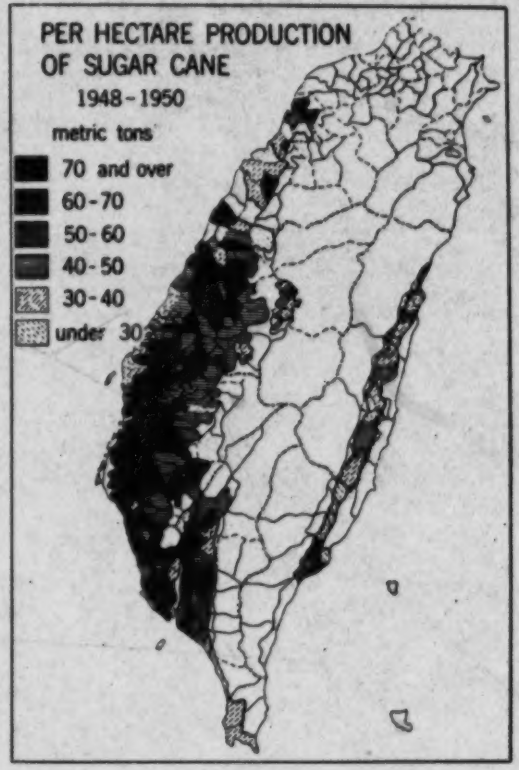
PER HECTARE PRODUCTION
OF SUGAR CANE
1948-1950
metric tons
70 and over
60-70
50-60
40-50
30-40
under 30

FIG. 23

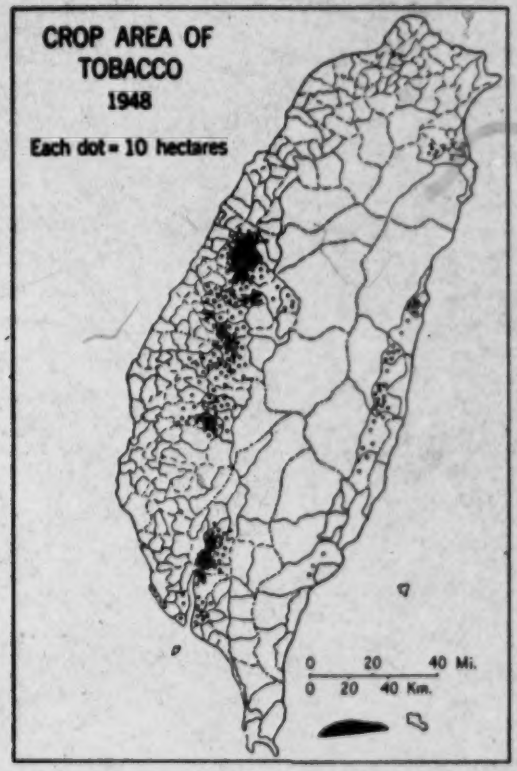
CROP AREA OF
TOBACCO
1948
Each dot = 10 hectares
0 20 40 Mi.
0 20 40 Km.

FIG. 30

CROP AREA OF JUTE
1948
Each dot = 10 hectares

FIG. 31

9: Yamasaki--232 N-5 (1896-1897) 1900 Formosans
116, 249, 439

The second chief product is sugar-cane. It is noteworthy that sugar-cane in Taiwan is much smaller than in the Riukiu Islands. It grows in large quantities in the plain of Tainan. November is the harvest month. The raw sugar is manufactured with the help of a primitive mill in large, cone-shaped huts, of which many can be seen in the southern plain. The most important centers of the export trade in sugar-cane are Takao and Tainan (Anping), the trade being very lively between January and April.

31: Hofmann--627-628 N-3 (1909) 1912 Formosans
116, 132, 311, 249

The sugar industry on Formosa has increased considerably; this industry will become [628] still more profitable when the projected plan for a system of irrigation with artificial dams has become a reality. In this way the tributary of the southern Tamsui may be utilized and more soil than hitherto will be irrigated. Southern Formosa is affected by the drought every winter.

31: Hofmann--629 N-3 (1909) 1912 Formosans
116, 249, 311

From the coast I went to Ako and visited the extensive sugar plantations there. These are run with modern equipment on a large scale; there are large factories and there is a great deal of activity. Aside from these plantations, however, the land around here has not been exploited to the fullest possible extent.

45:Stanford U. S-4, 5 1956 AD1 Formosa
~~AD1~~ AD1

A. Production of Rice

433 The production of rice has increased steadily in the postwar years; production in 1950 exceeded the 1938 production level peak achieved by the Japanese. However, because relatively less fertilizer is available for use, the per hectare yield of Formosan fields has not reached the record yield of 2,242 kilograms achieved under Japanese rule. Rice exports have been sacrificed to meet the domestic requirements of the swelling population of the island. In 1938, nearly 50 per cent of the 1.4 million metric tons of rice produced was exported; in 1954, only 36,000 metric tons of rice were available for export in spite of the fact that nearly 1.7 million metric tons were produced in that year. Such a drastic decrease in rice export has affected the dollar reserves of the Formosan people and made it difficult for the country to import the industrial goods necessary for continued economic development.[13]

243 Rice and sugar cane, the two most
249 valuable crops, compete for use of land

13. Industrial Development Commission, Industry of Free China, Vol. 3, No. 6, June 1955, p. 80 .

243 resources. Since rice cultivation and
244 harvesting takes about four months and sugar cane takes anywhere from fifteen to seventeen months before it can be harvested, rice has gradually taken the lead. Competition for land is especially keen in the area near Taichung, where paddy fields can be used either for the cultivation of rice or of sugar cane.

243 There are four main types of rice grown on Formosa -- Ponlai rice, native rice, upland rice, and glutenous rice -- and many varieties. Ponlai rice was introduced in Formosa during the Japanese occupation because it suited the tastes of the Japanese. It remains the most popular type of rice cultivated on the island because it has a high yield and good milling quality. Ponlai rice accounts for approximately 55 per cent of current rice production.

B. Production of Sweet Potatoes

244 Sweet potatoes are the second most important food stuff produced on Formosa. They are a staple of diet and are also used as raw material for alcohol and yeast as well as for hog feed. The major part of the annual
251 crop of sweet potatoes is sun-dried to produce chips which can be stored with minimum waste.

C. Production of Sugar Cane

249 Sugar cane is the raw material for
648 Formosa's sugar industry. Postwar increase
433 in production is all the more remarkable since in the years before the war the Japanese did all they could to exploit the potentialities of sugar cane production to meet the sugar requirements of Japan proper.

Sugar cane is usually planted in the summ June to September. About a year and a half are required before the cane is ready for harvest. Under the International Sugar Agreement concluded in London in 1953, Formosa is permitted to export 600,000 metric tons of sugar annually. Governm[illegible]t policy has been adapted to meet this quota and allow for domestic consumption. Land once used for sugar cane is now being used to produce other products.

D. Production of Wheat

243 Wheat produced on Formosa accounts
433 for less than one per cent of the total value of the island's farm production. For this reason it has been generally believed that Formosa lacks the conditions suitable for

379 Formosa has not yet exploited the hydro-electric potential offered by its heavy annual rainfall and the steepness of its river gradients, and no sustained effort has been made to compensate for the varying water reserves available at different times of year, headwater erosion, the narrow valleys in which the rivers flow, and the silt and gravel which combined to reduce the efficiency of the streams as a source of power. For these reasons, the economic development of potential power sites is as important to Formosa as the implementation of flood control and irrigation programs.

Currently, the Taiwan Power Company has established a committee to investigate and plan the generation of power by atomic energy on Formosa.

IV. FOOD PROCESSING INDUSTRIES

A. The Production of Sugar

249 The history of the sugar industry in Formosa
433 goes back to 1349, when islanders "boiled sea
431 water to make salt and fermented molasses to produce liquor." [17] In 1650, when the Dutch were occupying Formosa, some 6,000 metric tons of sugar cane were produced each year. Of this amount, two-thirds were exported to Japan and marketed in lands as far away as Persia. Under the rule of Cheng Ch'eng-kung (Koxinga), who

17. China News Press, T'ai-wan Ching-chi Nien-pao, 1953 [Annual of Taiwan's Economy, 1953], Taipei, 1953, p. 45.

249 defeated the Dutch, annual production rose to
433 18,000 metric tons, a large part of which was ex-
439 ported to the Philippines and to Japan. In 1870, total production amounted to 73,000 metric tons; 63,7000 metric tons were exported. During the Japanese occupation of Formosa, the island's sugar industry was developed to supply the require-
257 ments of Japan proper. Four Japanese companies
433 controlled Formosa' sugar industry. During the
471 1930's, 42 mills able to process a total of 65,000 metric tons of sugar cane were in operation. The sugar syndicate owned 117 hectares of land, a railway extending 2,800 kilometers, had a staff of 5,000, employed 19,000 workers, and generated its own power. After the war, all of the mills came under the control of the government-owned Taiwan Sugar Corporation. In 1947, six mills were incorporated, bringing the total number of mills in operation to 36. At present, only 26 mills are in operation; for reasons of economy, ten mills were shut in the period 1951-52, and production goals for 1954-55 were lowered.

472 In addition to the Taiwan Sugar Corporation,
259 which is the sole producer of refined sugar, some 52 private companies belonging to the Taiwan Brown Sugar Association produce brown sugar for domestic use and foreign export.

257 The milling capacity of the 26 mills controlled
433 by the Taiwan Sugar Corporation is 49,350 metric tons of sugar cane per day; sugar recovery is about 12 per cent. These mills operate an average of 150

C F 423 427

tenants there has been a rent reform program, which went into effect in 1949 and set a maximum rental ceiling of 37.5 percent of the total yield (average rental had theretofore ranged from 46 to 62.5 percent of the total yield). The income of tenant farmers has, in consequence of the program, risen by an average of 30 percent. The reform legislation provides that where the main crop yields are less than 20 percent of normal the tenant shall not be required to pay any rent at all. It also gives the farmer security of tenure (landlords may no longer refuse to renew contracts in order to re-rent on more favorable terms), and it restricts landlords' right to dispossess tenants. By 1951, 97.54 percent of the tenant farmers had completed new contracts under the new law, and the landlord problem had been brought, for the most part, under control. The price of land has steadily declined, which, of course, enables more and more tenant farmers to buy land to own. The rent reduction program has been carried out in cooperation with a Chinese-American organization, the Joint Commission on Rural Reconstruction, which is responsible for a program of general agricultural improvement: the construction of irrigation dams and canals, reclamation projects, the making available of better seeds and fertilizers, animal disease control, the organization of farmer associations and rural cooperatives, and rural health measures.

C F 241 654

By the end of the period 1950–1951, the use of US-financed fertilizer had brought rice production to the highest peak in the history of Taiwan. In exchange for much-needed foreign currency, twenty-two thousand, five hundred eighty-seven metric tons of Taiwan's surplus were exported to Japan and South Korea. Other foods basic to local consumption were also above peak prewar production levels. Sweet potatoes were up 20 percent, wheat 165 percent, and peanuts 89 percent. Considering the handicaps under which the government started, the economy of Taiwan is now surprisingly stable, largely because of the increased agricultural productivity reflected in the foregoing statistics.

C F 652

Economic Reform

In 1949, to meet the economic crisis precipitated by the soaring inflation of the Chinese National currency, to which the Taiwan dollar was then linked, a fresh start was made by introducing a new currency, linked to the US dollar and backed by gold bullion brought over from the mainland. At the same time, a series of deflationary measures were enlisted. The government's expenditures, for example, were curtailed by reducing its personnel and cutting back certain of its activities; at the same time, its resources were increased by means of a new luxury tax (based upon ownership of property, including cars and refrigerators), a defense tax, the floating of bonds, and the sale of government assets. The program, as a whole, had the effect of encouraging private enterprise, so that the usual sources of revenue (customs receipts, returns from the salt monopoly, the postal services, and assorted government enterprises in fields like telecommunication, air transport, navigation, petroleum, aluminum, gold, coal, copper, and steel) became more productive.

C F [377] [249] 433

Industrial Recovery

In industry, Taiwan's return to prosperity has been extremely rapid. At the time of Japan's surrender, the annual coal production had dropped to 776,000 metric tons (as compared to peak production of 1,182,635 in 1941); electric power had fallen off to 52,646 KW (as compared to the peak load of 152,355 KW in 1943); the production of sugar (the chief product for export) had declined to 86,073 metric tons (as compared to 1,418,000 metric tons before WW II), that of cement to 78,000 metric tons (as compared to peak production